Experiment 2

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Subject Name: Full Stack **Subject Code:23CSH-382**

1. **Aim:** To implement Single Page Application (SPA) navigation in the EcoTrack application using React Router, secure application routes using context-based authentication, and extend nested dashboard routing through follow-up enhancements.

2. **Objective:**

After completing this experiment and its follow-up tasks, the student will be able to:

1. Configure client-side routing in a React application using React Router
2. Implement SPA navigation without full page reloads
3. Design and apply protected routes using route-guard patterns
4. Manage shared authentication state using React Context API
5. Implement nested routing to build dashboard-style layouts
6. Extend existing nested routes by adding new dashboard sections
7. Implement logout functionality by updating shared context state
8. Analyze route access behavior and explain redirection logic
9. Understand the role of Context API in shared state management and its comparison with Redux at an introductory level.

3. **Implementation/Code:**

Header.js:

```
import {Link} from "react-router-dom";

const Header = ({ title }) => {
  return (
    <header style= {{
      padding:"1rem",
```

```
        backgroundColor:"#27ae60",
        color:"white",
        textAlign:"center",
      }}>
        <h2>{title}</h2>
        <nav>
          <Link to="/" style={{marginRight:"1rem",color:"#79e44f"}}>
          Dashboard
          </Link>
          <Link to="/logs"
    style={{marginRight:"1rem",color:"#79e44f"}}>
          Logs
          </Link>
          <Link to="/login"
    style={{marginRight:"1rem",color:"#79e44f"}}>
          Login
          </Link>

          <Link to="/logout"
    style={{marginRight:"1rem",color:"#79e44f"}}>
          Logout
          </Link>

        </nav>
      </header>
    );
};

export default Header;
```

AuthContext.js:

```
import { createContext,useContext,useState } from "react";

const AuthContext = createContext(null);

export const AuthProvider =({children})=>{
   const [ isAuthenticated, setIsAuthenticated] = useState(false);
```

```
    return(
        <AuthContext.Provider value = {{ isAuthenticated,
     setIsAuthenticated}}>
            {children}
        </AuthContext.Provider>
    )
}

export const useAuth = () => useContext(AuthContext);
```

logs.js:

```
export const logs = [
  { id: 1, activity: "Car Travel", carbon: 4 },
  { id: 2, activity: "Electricity Usage", carbon: 6 },
  { id: 3, activity: "Cycling", carbon: 0 },
  { id: 4, activity: "Bus Travel", carbon: 3 },
  { id: 5, activity: "Solar Energy Usage", carbon: 1 },
  { id: 6, activity: "Flight Travel", carbon: 8 },
];

export default logs;
```

Dashboard.js:

```
import logs from '../data/logs'
import Header from '../components/header'
const totalCarbon = logs.reduce ((sum, log) => sum+log.carbon,0)

const Dashboard = () => {
    return (

    <div >
        <h2>{Header}</h2>
        <p style={{padding
     :"1rem",backgroundColor:"#3175a2",color:"#d6eaf8",textAlign:"cente
     r"}}>Total Carbon Footprint:{totalCarbon}</p>

        <ul style={{padding
     :"1rem",backgroundColor:"white",color:"#111",textAlign:"center"}}>
            {logs.map((log)=>(
```

```
            <li key ={log.id}>
                {log.activity}:{log.carbon} kgs
            </li>
          ))}
        </ul>
    </div>

)
}
export default Dashboard;
```

DashboardAnalytics.js:

```
const DashboardAnalytics =()=>{
    return (
        <p>This is Dashboard Analytics</p>
    )
};
export default DashboardAnalytics;
```

DashboardSummary.js:

```
const DashboardSummary =()=>{
    return (<p>This is Dashboard Summary</p>)
}

export default DashboardSummary;
```

DashboardLayout.js:

```
import { Link,Outlet } from "react-router-dom";
const DashboardLayout = ()=>{

    return (
        <div style={{padding:"1rem"}}>
            <h3>Dashboard</h3>

            <nav>
                <Link to ="/summary">Summary</Link> |{" "}
                <Link to ="/analytics">Analytics</Link>
            </nav>
            <hr/>
```

```
            <Outlet/>

        </div>

    )
};

export default DashboardLayout;
```

Login.js:

```
import { useAuth } from "../context/AuthContext";
import { useNavigate} from "react-router-dom";

const Login =()=>{
    const {setIsAuthenticated}=useAuth();
    const navigate = useNavigate();

    const handleLogin=() => {
        setIsAuthenticated(true);
        navigate("/");
    };

    return (
        <div style={{padding:"1rem"}}>
            <h3>Login Page</h3>
            <button onClick={handleLogin}>Login</button>
        </div>
    )
}

export default Login;
```

Logout.js:

```
import { useAuth } from "../context/AuthContext";
import { useNavigate} from "react-router-dom";

const Logout =()=>{
    const {setIsAuthenticated}=useAuth();
    const navigate = useNavigate();
```

```
    const handleLogout=() => {
        setIsAuthenticated(false);
        navigate("/");
    };

    return (
        <div style={{padding:"1rem"}}>
            <h3>Logout Page</h3>
            <button onClick={handleLogout}>Logout</button>
        </div>
    )
}

export default Logout;
```

ViewLogs.js:

```
import logs from "../data/logs";

const Viewlogs = () => {
    return (
        <div>
            <h2>Experiment Logs</h2>
            <ul>
                {logs.map((log, index) => (
                    <li key={log.id}>
                    {log.activity}: {log.carbon} kg CO2
                    </li>
                ))}
            </ul>
        </div>
    )
}
export default Viewlogs;
```

PrototectedRoute.js:

```
import {Navigate} from "react-router-dom";
import { useAuth } from "../context/AuthContext";

const ProtectedRoute= ({children})=>{
    const {isAuthenticated} = useAuth();
```

```
    if(!isAuthenticated){
        return <Navigate to="/login" replace/>
    }

    return children;
}

export default ProtectedRoute;
```

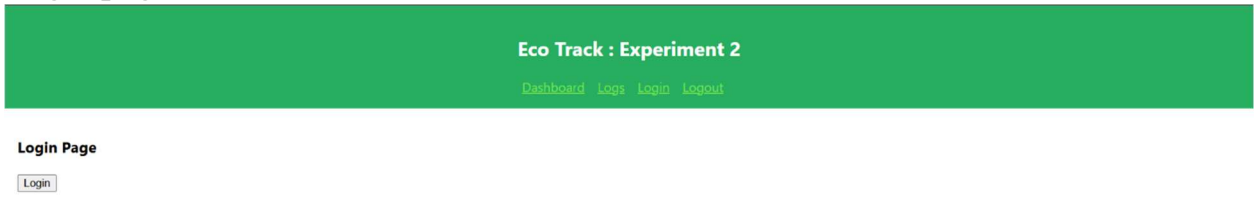
App.js:

```
import Header from "./components/header";

import { BrowserRouter,Routes,Route } from "react-router-dom";
import Login from "./pages/login";
import Viewlogs from "./pages/Viewlogs";
import DashboardLayout from "./pages/DashboardLayout";
import DashboardAnalytics from "./pages/DashboardAnalytics";
import DashboardSummary from "./pages/DashboardSummary";
import ProtectedRoute from "./routes/ProtectedRoutes";
import Logout from "./pages/logout";

function App (){
  return (
  <BrowserRouter>
    <Header title="Eco Track : Experiment 2 "/>
      <Routes>
        <Route path= "login" element={<Login/>}/>
        <Route path= "/" element=
        {
        <ProtectedRoute>
          <DashboardLayout />
        </ProtectedRoute>
        }>

        <Route index />
        <Route path="Summary" element={<DashboardSummary/>}/>
        <Route path="Analytics" element={<DashboardAnalytics/>}/>
        <Route path="logs" element={<Viewlogs/>}/>
```

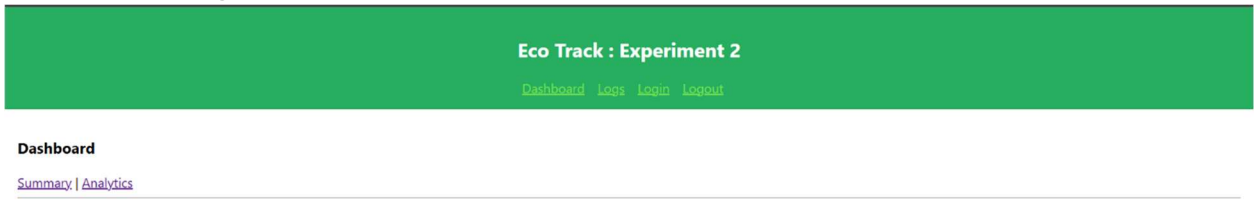
```
      </Route>
    </Routes>
    <Routes>
      <Route path="logout" element={<Logout/>}/>
    </Routes>

  </BrowserRouter>
)
}
export default App;
```

4. Output:

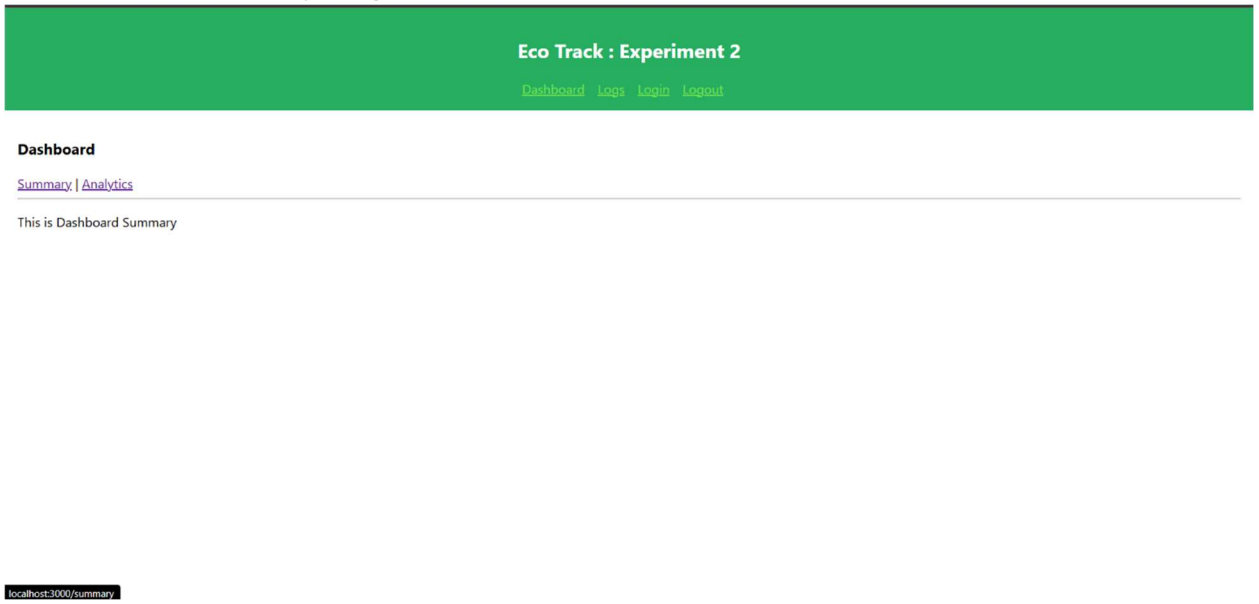
Login page:



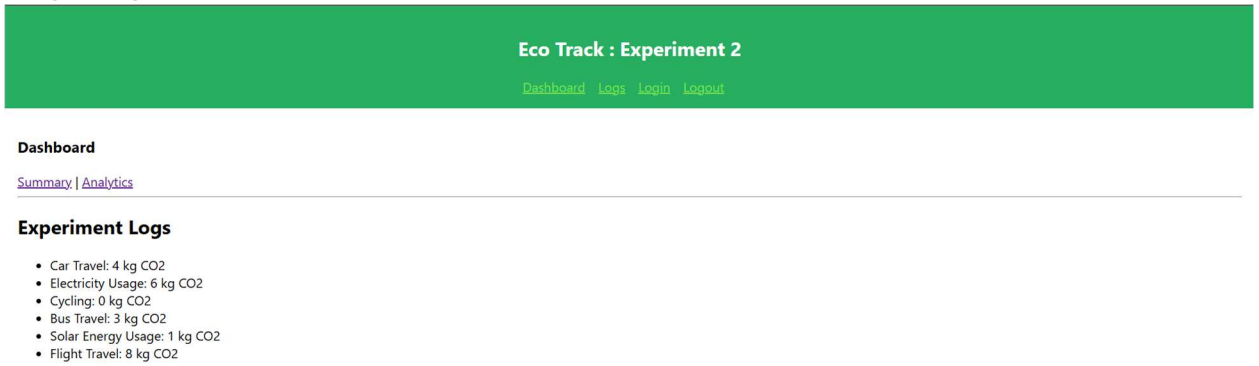
Dashboard Page:



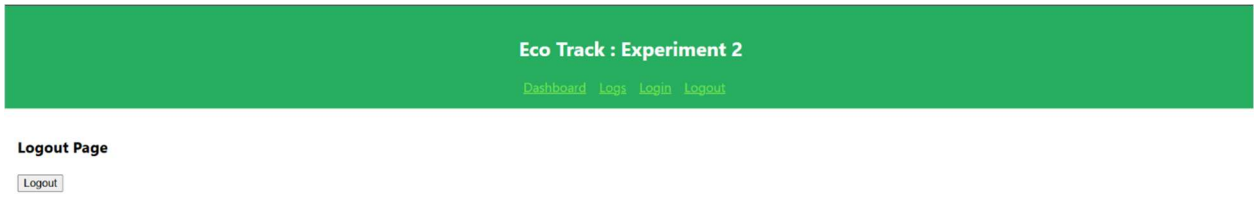
Dashboard Summary Page:



Logs Page:



Logout Page:



5. Learning Outcome

1. **Learnt about react files.**
2. **Learnt Design and apply protected routes using route-guard patterns.**
3. **Learnt Implement nested routing to build dashboard-style layouts.**